A NEW FACILITY FOR HIGH-ENERGY NEUTRON-INDUCED FISSION STUDIES

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A new facility is constructed for measurements of neutron-induced fission cross sections on an absolute scale, i.e. versus the *np* scattering cross section, which is adopted as the primary neutron standard. Angular distributions of fission fragments are being measured as well, that allows us to deduce data on fission anisotropy and transferred linear momentum, which are virtually unmeasured for high-energy neutron fission. The study is motivated by needs of neutron metrology, fission theory, and waste transmutation concepts.

The facility makes use of the Uppsala neutron beam produced via the ^{7}Li(p,n) reaction in the 20–180 MeV energy region. Fission fragments are detected by Si surface barrier detectors in a circular geometry. In order to measure neutron flux, recoil protons from polyethylene layer backings are detected by telescopes consisting of Si detectors and CsI(Tl) scintillator crystals. Time-of-flight distribution of fission events is measured by parallel plate avalanche counters.

An advantage of the experiment is that the fission fragment detection and the neutron flux measurement via *np* scattering are performed simultaneously and at the same position in the beam, and therefore many sources of systematic errors cancel out. Further reduction of systematic errors is achieved due to "embedded" determination of the effective solid angle of the detectors by counting α-particles from radioactive decay of target nuclei.

The performance of the facility is illustrated by preliminary data obtained for the ^{238}U(n,f) reaction.

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